Product Specification

PoE over Coaxial Extender - Receiver

VC-203PR

Version 1.0

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Change History:

Revision:	Date:	Author:	Change List
Version 1.0	2013/6/11	Bryant Wu	Initial Release

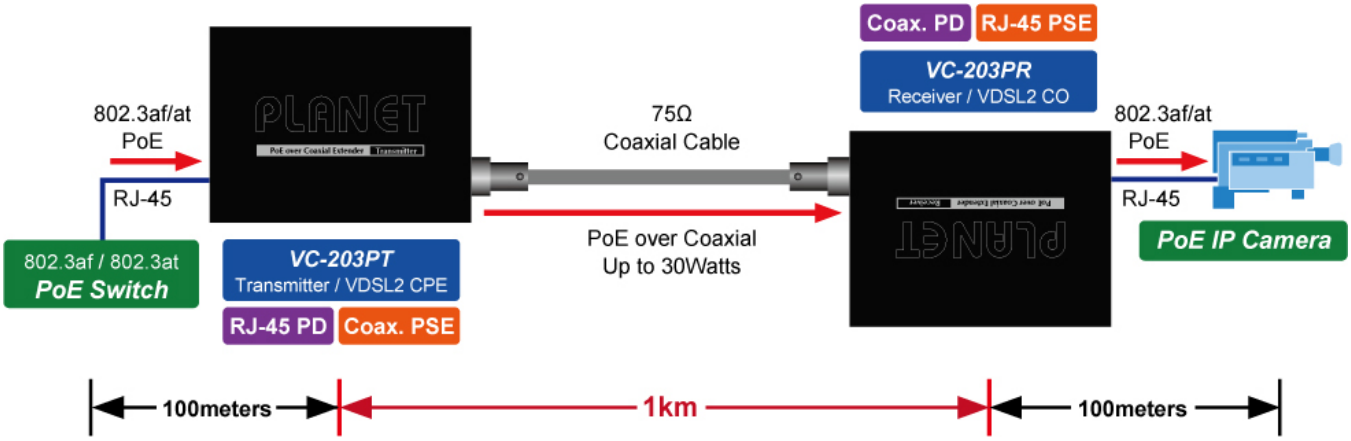
Author:	Bryant Wu	**Editor:**	Bryant Wu
Reviewed By:	Kent Kang	**Approved By:**	Tom Shih

1. PRODUCT DESCRIPTION

The PLANET VC-203Px series PoE over Coaxial Extender is designed to extend IP Ethernet transmission and inject power over an existing coaxial cable for distance up to 1000m (3280ft) to PoE IP camera, PoE Wireless AP and any 802.3af/at complied powered device (PD).

The VC-203Px consists of a Transmitter and Receiver set which can work in pair without any power adapter anywhere on your network infrastructure. The solution contains two brand-new products:

- **VC-203PT**: 1-Port 10/100TX PoE PD + 1-Port BNC PoE over Coaxial PSE Extender – Transmitter
- **VC-203PR**: 1-Port 10/100TX PoE PSE + 1-Port BNC PoE over Coaxial PD Extender – Receiver

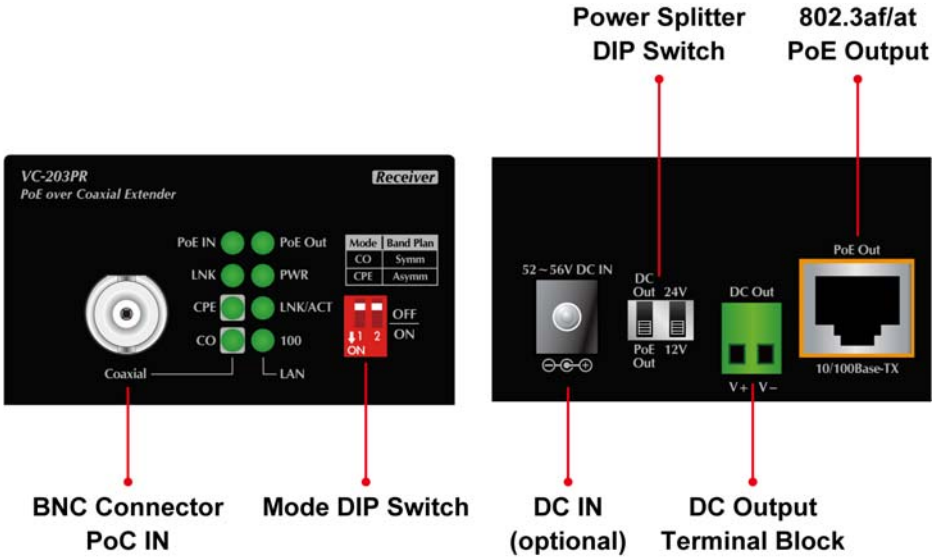


Models		VC-203PT	VC-203PR
PoE over Coax. Extender		Transmitter	Receiver
Power Input (Optional)	PoE	RJ-45: 802.3af/at PoE In UTP cable, up to 100m	BNC: PoE over Coaxial In Coaxial cable, up to 1km
	DC	DC Jack: 52~56V DC In	DC Jack: 52~56V DC In
Power Output	PoE	BNC: Power over Coaxial Out Coaxial cable, up to 1km	RJ-45: 802.3af/at PoE out UTP cable, up to 100m
	DC	--	2-Pin Terminal Block : Selectable 12V/24V DC

It is perfect solution for sending IP Video links and power to remote PoE IP camera installation that are beyond the 100 meters distance limit of Ethernet.

Power over Coaxial

Based on IEEE 802.3at High Power over Ethernet and up to 25 watts of power output, PLANET PoE over coaxial extender solution eliminates the need for additional remote site power while allowing a single PoE source, such as a PoE network switch, to provide power to both transceivers and the camera at long range. This feature eliminates the need for local and remote site power supplies.



IEEE 802.3at/af PoE Injector and Splitter in one box design

The VC-203PR is a Single-Port, 802.3at High Power over Ethernet Injector providing maximum up to 30 watts of power output over Ethernet cable which allows data and power to transmit simultaneously through the cable to PoE PD (Powered Device). In addition, the VC-203PR also features PoE splitter function with selectable 12V/24V DC power output which makes non-PoE equipment power up as well.

Stable Operating Performance under Difficult Environments

The VC-203PT and VC-203PR extender is the perfect solution for extended distance data and power transmission for warehouses, parking lots, campuses, casinos, and many more. They can operate stably under temperature range from -40 to 75 degrees C which enables the users to conveniently apply the device in almost any location of the network.

2. PRODUCT FEATURES

Physical Port

- 1 x 10/100Base-TX RJ-45 copper interface (802.3at/af PoE Out)
- 1 x BNC connector (Power and data receiver)
- 1 x 2 Pin Terminal Block for 12/24V DC output

Power over Ethernet

- Supports Power over Ethernet PD, PoE Injector and PoE Splitter
- Eliminates Power cabling with PoE over Coaxial
- Ethernet over coaxial up to 1km with 5C2V/RG6 75Ω cable
- Complies with IEEE 802.3af / IEEE 802.3at Power over Ethernet on RJ-45 port
- Supports PoE Power up to 30.8 watts (Vary on Power Source and Coaxial Distance)
- Auto detect remote powered device (PD)

- Supports Adjustable two different output voltage options (12V / 24V) to fit various non-PoE devices

Layer 2 Features

- Supports Auto-negotiation and 10/100Mbps half / full duplex
- Prevents packet loss with back pressure (Half-Duplex) and IEEE 802.3x PAUSE frame flow control (Full-Duplex)

VDSL2 Features

- One box design, Master / Slave selectable via DIP Switch
- Defines Asymmetric (Band Plan 998) and Symmetric band plans for the transmission of Upstream and Downstream signals

Industrial Case / Installation

- Supports extensive LED indicators for network diagnostics
- IP30 metal case protection
- Compact size, DIN Rail and Wall Mount Design
- Power Input: External DC or PoC (Power over Coaxial) power input
- Supports EFT protection **2000** VDC for power line
- Supports **2000** VDC Ethernet ESD protection
- -40 to 75 degrees C operating temperature

3. PRODUCT SPECIFICATION

3.1 MAIN COMPONENT

PoE Power IC: CONFIDENTIAL

3.2 FUNCTION SPECIFICATION

Model		**VC-203PR / Receiver**
Hardware Specifications		
Interface	**Copper**	10/100Base-TX RJ-45 Auto-negotiation/ Auto-MDI/MDI-X 802.3at/af PoE Output
	Coaxial	BNC, female Power over Coaxial Input
	DC Socket (Optional)	52~56V DC input
	DIP-Switch	2-Position DIP Switch(Front) ■ Selectable **CO** or **CPE** mode (Default: **CO**) ■ Selectable Band plan: **Asymmetric** or **Symmetric** (Default: **Asymmetric**)
		2-Position DIP Switch (Rear) ■ PoE out or DC out (Default: **POE Out**) ■ 12V DC / 24V DC output voltage (Default: **12V DC**)

LED Indicators		LED is Green Color ■ PWR ■ PoE IN ■ PoE Out ■ LNK ■ CO ■ CPE ■ LNK/ACT ■ 100
ESD Protection		2KV DC
EFT Protection		2KV DC
Enclosure		IP30 metal case
Installation		Wall mount or DIN rail with optional kit
Dimensions (W x D x H)		94 x 70.3x 39.2 mm
Weight		302g
Power Requirements		■ BNC Power over Coaxial Input: 44~57V DC ■ DC Input: 52~56V DC
Performance* (Down / Up Stream)**		Asymmetric Mode (Data Only) 200m → 100Mbps(VC-203PR to VC-203PT) / 63Mbps(VC-203PT to VC-203PR)
		200m -> 100/63Mbps 400m -> 97/58Mbps 600m -> 93/54Mbps 800m -> 85/46Mbps 1000m -> 74/37Mbps 1200m -> 62/29Mbps
		Symmetric Mode (Data Only) 200m → 90Mbps(VC-203PR to VC-203PT) / 100Mbps(VC-203PT to VC-203PR)
		200m -> 90/100Mbps 400m -> 88/100Mbps 600m -> 73/84Mbps 800m -> 67/72Mbps 1000m -> 56/57Mbps 1200m -> 47/42Mbps
Power over Ethernet/Coaxial		
PoE Standard		IEEE 802.3at Type 2 IEEE 802.3af
PSE Interface		RJ-45 48~56V DC, 600mA max. End-Span, Pin 1/2(+), 3/6(-)
PD Interface		BNC Input Range: 44~57V DC
DC Power Output		12V DC, 2A max. 24V DC, 1A max.
Max. PoE Budget	**Power Input by PoC**	RJ-45 : 20 watts
	Power Input by DC	RJ-45 : 30 watts
Standards Conformance		
Standards Compliance		IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3af Power over Ethernet (802.3at Type 1)

	IEEE 802.3at Power over Ethernet (802.3at Type 2)
Regulation Compliance	FCC Part 15 Class A, CE
Environment	
Temperature	Operating: -40~75 degrees C Storage: -40~75 degrees C
Humidity	Operating: 5~95% (Non-condensing) Storage: 5~95% (Non-condensing)
Cable	
Coaxial	RG-6/U cable (Recommended) max. 500 m with PoE+ (1,640 ft.) max. 800m with PoE (2,624 ft.) max. 1200 m without PoE (3,937ft.)

* The actual data rate will vary on the quality of the copper wire and environment factors.

**Downstream means CO to CPE data rate, and Upstream is CPE to CO data rate.

3.3 PHYSICAL SPECIFICATIONS:

Dimensions:

94 x 70.3x 39.2 mm (W x D x H)

Weight:

302g

■ Product Outlook

- **VC-203PR** dimensions (W x D x H): 94 x 70.3 x 39.2 mm

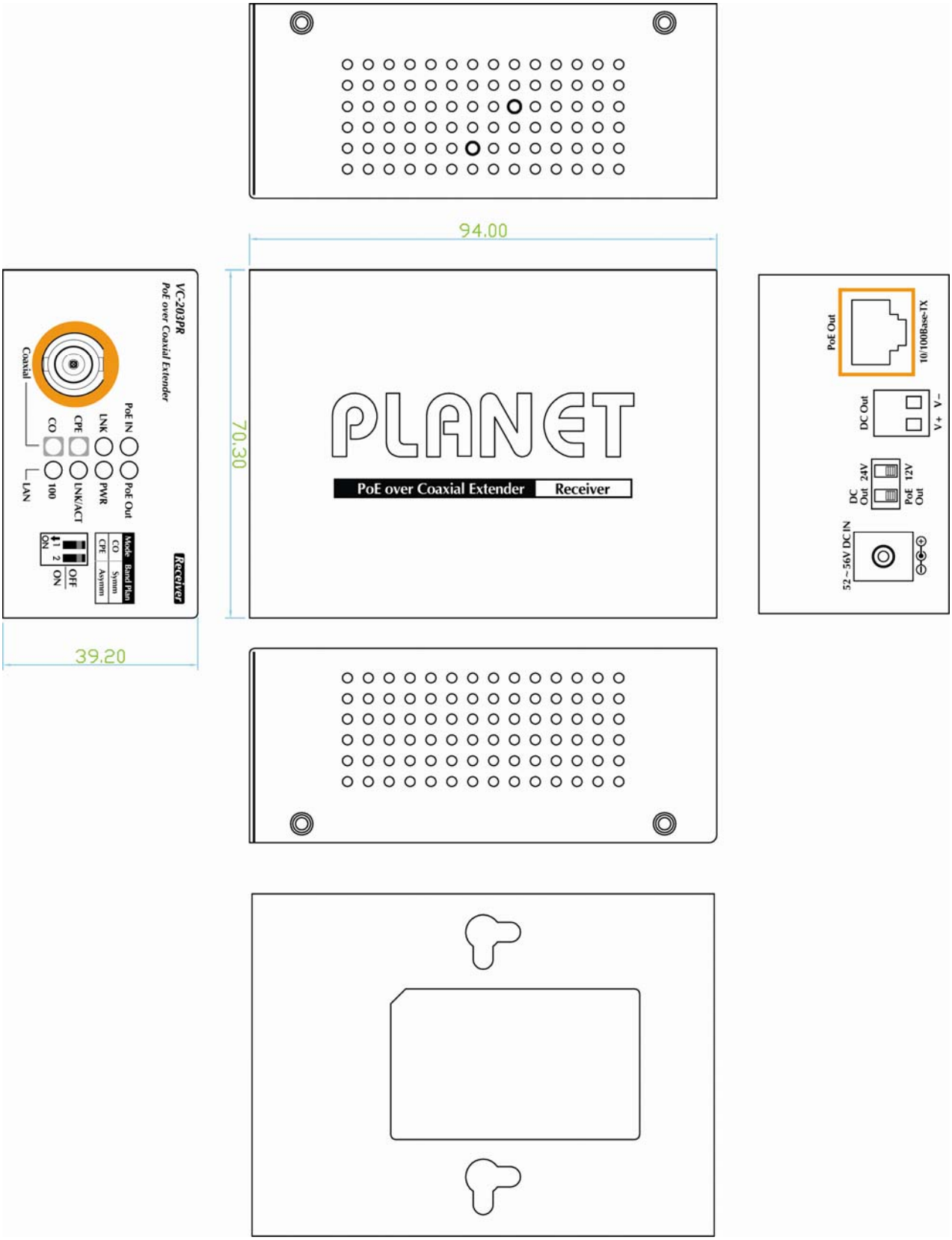


Figure 3-1 VC-203PR diagram

■ Front Panel – VC-203PR

Figure 3-2 shows the front panel of the VC-203PR Industrial Power over Coaxial Extenders.

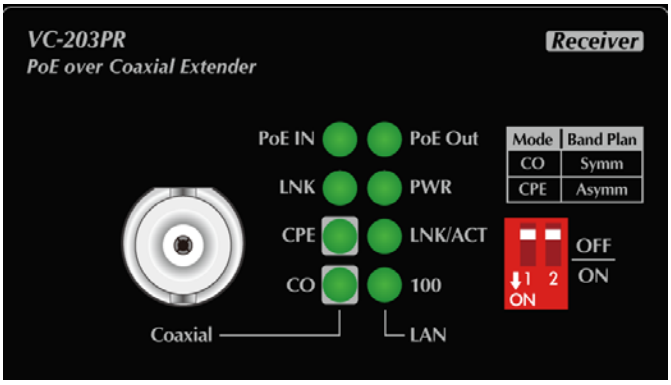
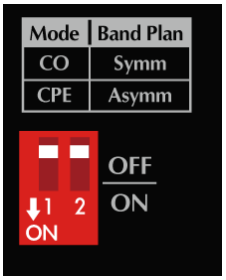


Figure 3-2: VC-203PR front panel

■ Front Panel DIP Switch Setting

The front panel of the VC-203PT provides one 2-DIP switch which is for configuring coaxial link CO/CPE mode and Band plan function. Refer to the table below to know about the 2-DIP switch settings and descriptions:



	DIP-1	DIP-2
	Mode	Band Plan
OFF	CO (default)	Symmetric
ON	CPE	Asymmetric (default)

Note: Since the VDSL 2 Extender should runs in pair that one end at CO mode and the other end with CPE mode. If operates at both CO-mode or both CPE-mode at both ends will results in failure connection.

■ LED Indicators

➢ **System**

LED	Color	Function
PWR	**Green**	**Light**: indicates the power is on.

➢ **Coaxial / VDSL2 Interfaces**

LED	Color	Function
LNK	**Green**	**Light**: indicates that the coaxial link is established.
		Fast Blink: indicates that the coaxial link is at training status (about 10 seconds).
		Slow Blink: indicates that the coaxial link is at idle status.
CO	**Green**	**Light:** indicates the coaxial Bridge is running at CO mode.
CPE	**Green**	**Light:** indicates the coaxial Bridge is running at CPE mode.

➢ **RJ-45 10/100Base-TX Interfaces**

LED	Color	Function
100	Green	**Light**: indicates the extender is successfully connecting to the network at 100Mbps.
		OFF: indicates the extender is successfully connecting to the network at 10Mbps.
LNK/ACT	Green	**Blink:** indicates the extender is actively sending or receiving data over that port.

➢ **RJ-45 PoE Indicators**

LED	Color	Function
PoE IN	Green	**Light:** indicates the BNC connector is receiving the PoE Power.
PoE Out	Green	**Light:** indicates the RJ-45 Port is providing PoE power

■ Power over Coaxial Extender Rear Panel

Figure 3-3 shows the rear panel of the VC-203PR Industrial Power over Coaxial Extenders.

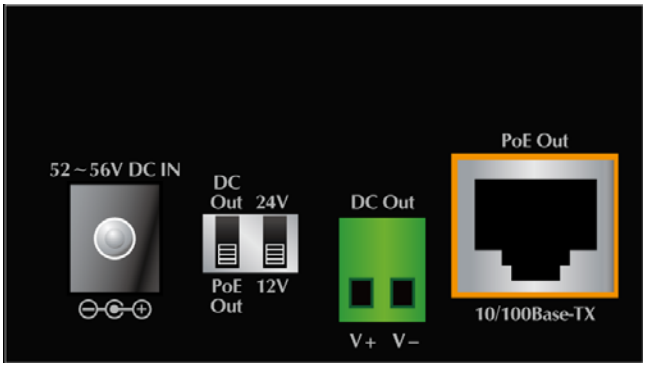
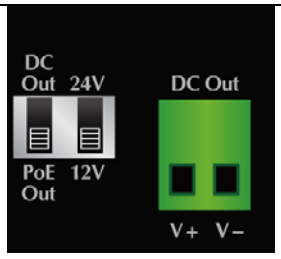


Figure 3-3: VC-203PR rear panel

■ VC-203PR Rear Panel: DIP Switch Setting



DIP-1	DIP-2
Power Output	Voltage
DC Out	24V
PoE Out (default)	12V (default)

■ VC-203PR Rear Panel: 2-Pin Terminal Block

If there is no power socket in the network environment for non-PoE networked device, the VC-203PR can be of great help by conveniently and easily providing this Ethernet device with DC power. Via the DIP switch configuration, the VC-203PR separates the power out and provides two kinds of DC power output and its voltage and current are shown below:

DC Power Output
12V DC, 2A max.
24V DC, 1A max.

Note: To avoid VC-203PR damage, remove DC power / Coaxial cable before change voltage. Wrong DC out to the connected end device may damage the device.

3.4 ENVIRONMENTAL SPECIFICATION

Operating:

Temperature: -40°C ~ 75 degrees C

Relative Humidity: 5% ~ 95% (non-condensing)

Storage:

Temperature: -40°C ~ 75 degrees C

Relative Humidity: 5% ~ 95% (non-condensing)

3.5 ELECTRICAL SPECIFICATION

Input Voltage:

- BNC Power over Coaxial Input: 44~57V DC
- DC Input: 52~56V DC

3.6 REGULATORY COMPLIANCE

FCC Part 15 Class A, CE

3.7 REALIABILITY

MTBF > 100,000 hrs @ 25 degrees C

3.8 BASIC PACKAGING

■ VC-203PR	X1
■ User's Manual	X1

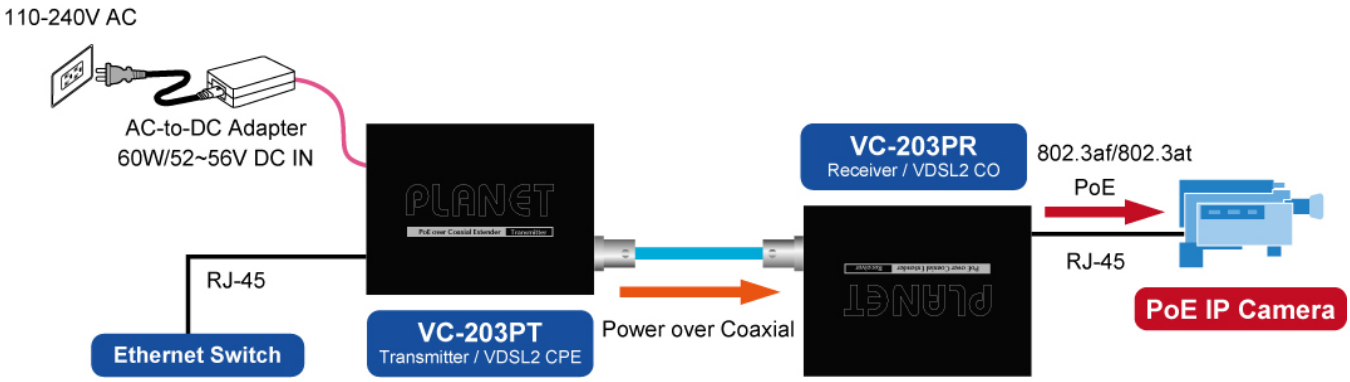
3.9 PACKING DIMENSION

Dimension:	215mm x 130mm x 68mm
Weight:	0.52kg (Gross Weight)
	12pcs in one carton

APPENDIX A: Applications

Applications of VC-203PT and VC-203PR

Type 1 – VC-203PT with 52~56V power adapter and VC-203PR with PoE power output

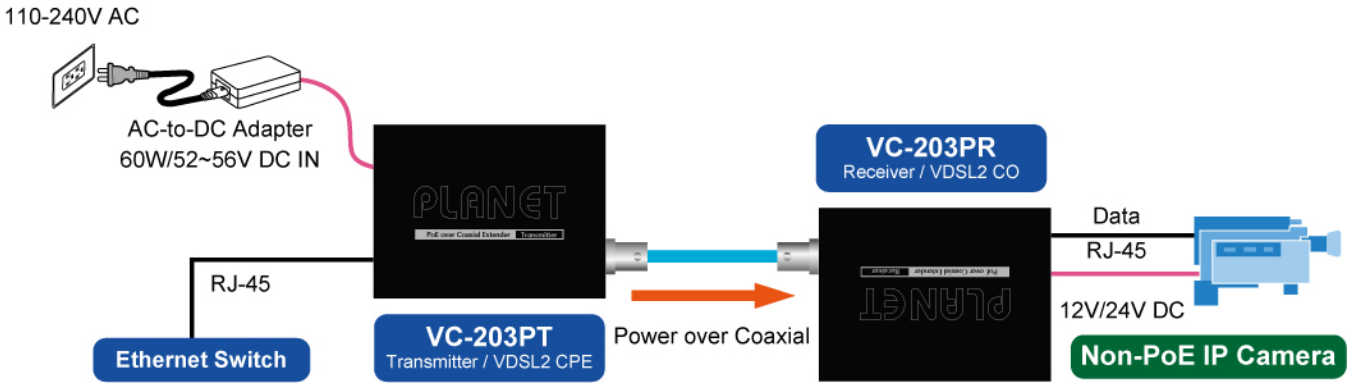


	CPE	CO
	VC-203PT	VC-203PR
Power Input	**Power adapter** with **52~56V DC** in	**BNC** with DC power over coaxial input
Power Output	**BNC** with DC power over coaxial output	**RJ-45** with 802.3at/af PoE output

CAUTION

1. PoE Output Capacity is based on different DC Power Input / PoE Input.
2. VC-203PT has two power input options; only one mode is available at one time. It cannot use PoE power input if power input of DC 52V or 56V is selected.

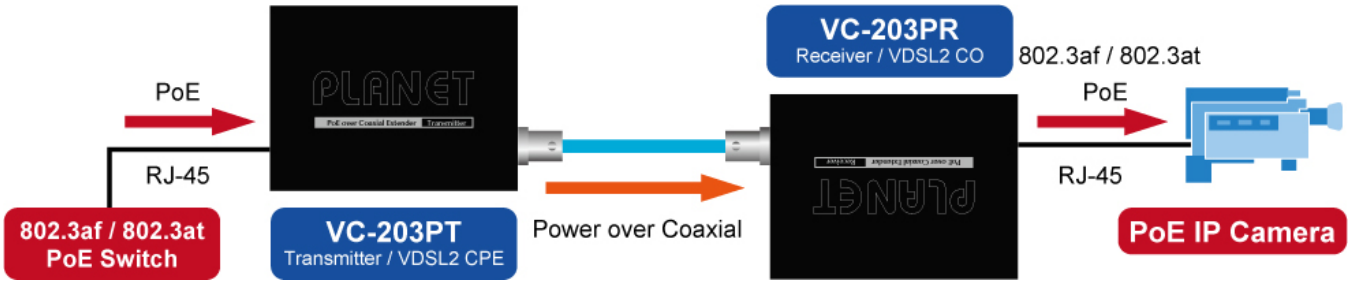
Type 2 – VC-203PT with 52~56V power adapter and VC-203PR with DC power output



	CPE VC-203PT	CO VC-203PR
Power Input	**Power adapter** with **52~56V** DC in	**BNC** with DC power over coaxial input
Power Output	**BNC** with DC power over coaxial output	**DC Terminal block** with **12V or 24V** DC output

CAUTION	1. Please ensure the VC-203PR output voltage is correct for remote device. 2. Please plug off the PoE Coaxial cable from VC-203PR before switching off the Power Voltage DIP during operation. Wait for 3 seconds until the “PoE IN” LED is completely OFF. Otherwise, it might damage your devices.

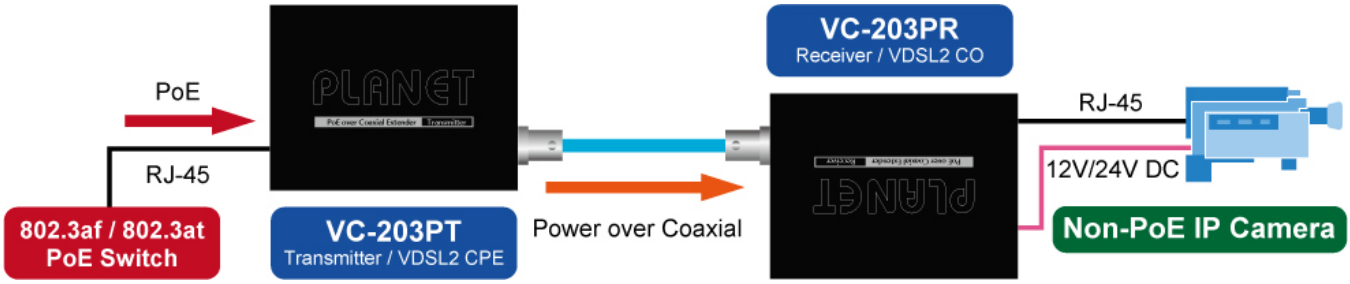
Type 3 – VC-203PT with PoE power input and VC-203PR with PoE power output



	CPE	CO
	VC-203PT	VC-203PR
Power Input	**RJ-45** with **802.3at/af** PoE input	**BNC** with DC power over coaxial input
Power Output	**BNC** with DC power over coaxial output	**RJ-45** with **802.3at/af** PoE output

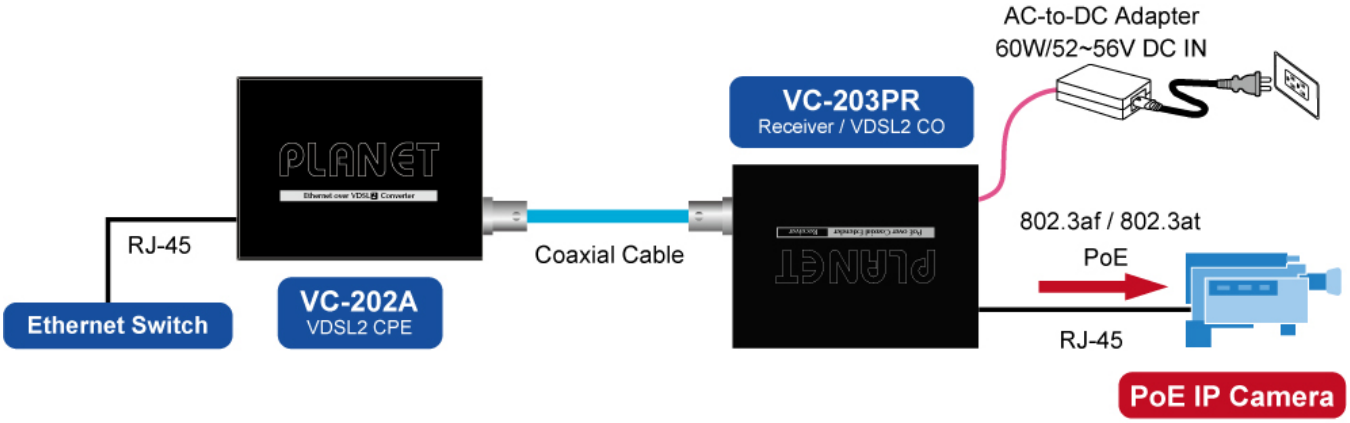
The VC-203PT accepts IEEE 802.3at equipment for optimal power injection. The other Non-standard PoE Power devices may cause the VC-203PT to malfunction.

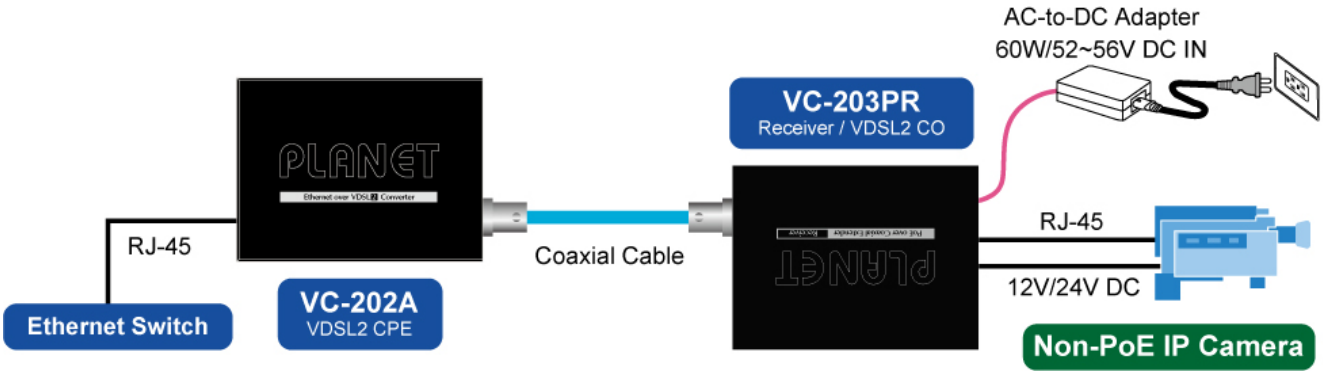
Type 4 – VC-203PT with PoE power input and VC-203PR with DC power output



	CPE	CO
	VC-203PT	VC-203PR
Power Input	**RJ-45** with **802.3at/af** PoE input	**BNC** with DC power over coaxial input
Power Output	**BNC** with DC power over coaxial output	**DC Terminal block** with **12V or 24V** DC output

Type 5 – PLANET VC-202A (not supports Power over coaxial) with coaxial link to VC-203PR and VC-203PR get external DC power input directly and RJ-45 with PoE output





Item	CPE	CO
	VC-202A / IVC-2002	VC-203PR
Power Input	**Power adapter** with **5V** DC in	**Power adapter** with **52~56V DC** in
Power Output	does not support power output	**DC Terminal block** with **12V or 24V** DC output OR **RJ-45** with **802.3at/af** PoE output

APPENDIX B: CAUTION

CAUTION	As the VC-203PT is power over coaxial, please confirm that other Non-PoE equipment is not connected with the coaxial cable. When you connect the coaxial cable with coax-LAN converter, CCTV camera, etc, it might cause other equipment to damage.

Please take care of the conditions of the resistance value of cables as follows.

RG-59/U：Less than 30Ω/1000 ft.

RG-6/U ：Less than 12Ω/1000 ft

Because there are various resistance values in the category of RG-59/U or RG-6/U cable.

APPENDIX C:

Power v.s. Distance - The distance factor (DC 56V in VC-203PT)

Coaxial / VC-203PR		100m	200m	300m	400m	500m	600m	700m	800m	900m	1000m	1100m	1200m
PoE Output	RJ-45 PoE Out(V)	50.4	48.8	47.4	46	44.5	43.6	42.3	39.5	38.8	37.6	35.7	35.3
	Remote PD power (Watts)	22.8	20.6	18.4	16.8	14.8	12.2	10	7.4	6.2	5.2	4.5	3.8
DC Output	24V	1A	1A	1A	0.91A	0.73A	0.58A	0.48A	0.37A	0.32A	0.26A	0.22A	0.19A
	12V	2A	2A	2A	1.71A	1.38A	1.14A	0.92A	0.73A	0.64A	0.58A	0.44A	0.38A
Throughput Asymmetric	Download /Upload Data Rate (Mbps)	100/65	100/63	99/60	97/58	95/56	93/54	89/50	85/46	79/41	74/37	68/32	62/29
Throughput Symmetric	Download /Upload Data Rate (Mbps)	93/100	90/100	89/100	88/100	80/92	73/84	70/78	67/72	61/65	56/57	51/50	47/42

* 5C2V / 75Ω / 22 AWG coaxial cable

Power v.s. Distance - The distance factor (PoE 56V in VC-203PT)

Coaxial / VC-203PR		100m	200m	300m	400m	500m	600m	700m	800m	900m	1000m	1100m	1200m
PoE Output	RJ-45 PoE Out(V)	48	46.5	45.1	43.8	42.2	41.2	39.5	37.7	36.4	35.3	33.8	33.8
	Remote PD power (Watts)	14.4	13.44	12.24	11.76	11.04	10.08	8.16	6.24	5.52	4.21	3.6	3.12
DC Output	24V	0.63A	0.58A	0.55A	0.5A	0.46A	0.41A	0.38A	0.33A	0.26A	0.23A	0.17A	0.15A
	12V	1.23A	1.15A	1.12A	0.98A	0.9A	0.82A	0.72A	0.62A	0.52A	0.46A	0.37A	0.32A
Throughput Asymmetric	Download /Upload Data Rate (Mbps)	100/66	100/65	99/60	97/58	95/56	93/54	89/50	85/46	79/41	74/37	68/32	62/29
Throughput Symmetric	Download /Upload Data Rate (Mbps)	91/100	89/100	89/100	88/100	80/92	74/85	70/78	67/72	61/65	57/58	51/50	47/42

* 5C2V / 75Ω / 22 AWG coaxial cable